KEITH
Engineering Inspired Design.

COVER SHEET ADDED FOR KEITH REVIEW STAMP

GARY MATZNER PARK
CONENGINEERS
KEITH PROJECT #: 13861.00

DATE: 05/16/2026

SUBMITTAL #34 ENGINEERED WOOD FIBER - FIBAR

CONTRACTOR HAS PROVIDED THE REQUESTED ADA COMPLIANCE DOCUMENTATION ADDED AS PAGE 14 & 15 IN THIS DOCUMENT.

CONTRACTOR TO INSTALL FIBAR TO MAUFACTURES SPECIFICATIONS INCLUDING COMPACTION AS DEEMED NECESSARY.

KEITH
954-788-3400
301 E. Atlantic Blvd
Pompano Beach, FL 33060

- [x] NO EXCEPTION OBSERVED
- [ ] MAKE NOTED CORRECTIONS - RESUBMISSION NOT REQUIRED
- [ ] REVISE AND RESUBMIT - SEE COMMENTS

Corrections or comments made on the shop drawings during this review do not release the Contractor from compliance with requirements of the drawings and specifications. This check is only for review of general conformance with the design concept of the project and general compliance with the information given in the contract documents. The Contractor is responsible for confirming and correlating all quantities and dimensions, selecting fabrication process and techniques of construction, coordinating his work with that of all other trades, and performing his work in a safe and satisfactory manner.

Date: 05/18/2026 By:

SUBMITTAL PACKAGE

ENGINEERED WOOD FIBER PLAYGROUND SAFETY SURFACING

Fibar® Engineered Wood Fiber (EWF) - Supplied by Pro Playground

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Project	Gary Matzner Park
Location	Village of Pinecrest, Florida
Contractor	Conengineers Builders LLC
Supplier	Pro Playground
Manufacturer	Fibar Group, LLC
Product	Fibar® Engineered Wood Fiber - EWF
Submittal Scope	Playground safety surfacing, installation method, certifications, concrete containment curb, and project-specific clarifications
Prepared For	Architect of Record / Owner Review and Approval

Submitted by: Conengineers Builders LLC

Jaime Ocampo, General Manager / CEO

SIGNATURE AND APPROVAL PAGE

Engineered Wood Fiber Playground Safety Surfacing Submittal

Project	Gary Matzner Park
Submittal Item	Fibar® Engineered Wood Fiber (EWF) - Supplied by Pro Playground
Contractor	Conengineers Builders LLC
Purpose	Contractor submission and Architect / Owner review and approval

A. Contractor Review / Submitted By

Conengineers Builders LLC submits this package for Architect of Record and Owner review. Contractor review is for general conformance with the Contract Documents and coordination of the submitted scope. It does not constitute engineering design of playground use zones, fall heights, drainage system, or post-acceptance maintenance responsibilities.

Company	Conengineers Builders LLC
Reviewed / Submitted By	Jaime Ocampo
Title	General Manager / CEO
Signature	_____
Date	_____

B. Architect / Owner Review and Approval

Approval of this submittal acknowledges the project-specific clarifications stated herein, including the omission of a separate drainage layer based on the permeability of the underlying material, the Architect of Record recommendation that the EWF not be mechanically compacted during installation, the required 6 in. x 12 in. Concrete Curb Type D for EWF confinement, swing/wear mat responsibility as stated, and Owner post-acceptance maintenance responsibility, including monitoring and maintaining the required EWF depth as natural compaction occurs.

Review Action	Approved / Approved as Noted / Revise and Resubmit / Rejected
Reviewer / Firm	_____
Name	_____
Title	_____
Signature	_____
Date	_____
Comments / Notes	_____ _____
	_____ _____

Important Approval Note

The approval section above is intended for Architect of Record / Owner review. If the Architect or Owner prefers to approve through Procore or a separate review stamp, this page may remain as the contractor-submitted acknowledgment page.

1. Submittal Purpose

Conengineers Builders LLC respectfully submits this Engineered Wood Fiber (EWF) playground safety surfacing package for the Gary Matzner Park project. The proposed EWF material will be supplied by Pro Playground and is intended for installation within the designated playground use zones as directed by the approved project documents, the Architect of Record, the Owner, and the Authority Having Jurisdiction.

This submittal includes the proposed material description, applicable ASTM / IPEMA certifications, installation narrative, and project-specific clarifications regarding drainage, swing mats / wear mats, concrete containment curb, and long-term maintenance responsibility.

2. Product Information

Material Type	Engineered Wood Fiber (EWF) playground safety surfacing
Commercial Product Name	Fibar® Engineered Wood Fiber
Manufacturer	Fibar Group, LLC
Supplier	Pro Playground
Use	Loose-fill playground safety surfacing under and around playground equipment
Certified Product Listing	Model EWF / Commercial Name: Fibar / Product Line: Fibar Engineered Wood Fiber / THK-HT: 12:12
Installation Depth	To meet the required safety depth established by the approved playground surfacing design. The City will monitor and maintain the required depth as natural compaction occurs.

Submittal Basis

The proposed material is not standard landscape mulch. It is an engineered wood fiber playground safety surfacing product supported by IPEMA third-party certification and manufacturer installation instructions.

3. ASTM / IPEMA Certifications

The attached IPEMA certificates identify Fibar Engineered Wood Fiber as certified through IPEMA third-party validation by TÜV SÜD America. The product listing identifies Model EWF, Commercial Name Fibar, Product Line Fibar Engineered Wood Fiber, THK/HT 12:12, Manufacturer Fibar Group, LLC.

Standard	Description	Relevance to Submittal
ASTM F1292-22	Standard Specification for Impact Attenuation of Surfacing Materials within the Use Zone of a Playground.	Supports impact attenuation performance of the surfacing material within playground use zones.
ASTM F2075-20	Standard Specification for Engineered Wood Fiber for Use as a Playground Safety Surface Under and Around Playground Equipment.	Confirms the material is engineered wood fiber suitable for playground safety surfacing, not ordinary mulch.
ASTM F3351-19e1	Test method related to shock absorption properties of a playground surface using g-max and HIC values described in ASTM F1292.	Supports evaluation of the surfacing system for shock absorption / impact attenuation performance.

4. Installation Narrative

The EWF shall be installed in general accordance with the current Fibar® Bulk Engineered Wood Fiber Installation Instructions, subject to the approved project documents, field conditions, and written direction by the Architect of Record and Owner.

Project-specific compaction clarification: The Architect of Record, in connection with the EWF surfacing design for this project, recommended that the EWF material not be mechanically compacted during installation. The EWF will therefore be placed, distributed, and hand-raked to a smooth finished condition, allowing natural compaction to occur over time. The City will be responsible for monitoring the EWF after installation and maintaining the required safety depth as the material settles or compacts through use.

The manufacturer instructions require the area to be well compacted and accurately graded, particularly where additional fill has been placed. The instructions also state that EWF is not recommended on grades greater than 10%, and that roots, stones, and vegetation must be removed before installation.

1. Verify final limits of the EWF safety surfacing areas, playground use zones, adjacent grades, and containment edges.
2. Confirm that the subgrade has been accepted, graded, compacted, and is ready to receive the EWF surfacing.
3. Construct the required concrete containment curb, Type D, 6 in. x 12 in., where directed by the Architect of Record to provide confinement of the EWF material.
4. Install playground equipment prior to final EWF placement, unless otherwise coordinated with the project team.
5. Mark the compacted design depth on playground equipment legs or other appropriate reference points, as recommended by the manufacturer.
6. Spread the Fibar EWF using appropriate equipment and hand labor as required. Sharp turning of equipment on the EWF shall be avoided.
7. Install all EWF material delivered for the designated areas. The material may initially remain above the border or finished grade until natural compaction occurs; this condition is consistent with the non-mechanical compaction approach recommended by the Architect of Record for this project.
8. Hand-rake the installed surface to provide a smooth finished condition.
9. Final depth, transitions, and finished condition shall be reviewed in the field as required by the project team.

Mechanical Compaction / Architect Recommendation

Mechanical compaction is not included. The Architect of Record recommended that the EWF not be mechanically compacted during installation. The manufacturer describes mechanical compaction as an optional method that may accelerate compaction and may be performed at additional cost. The City will monitor the surface after installation and maintain the required EWF depth as natural compaction occurs.

5. Drainage Layer Clarification

The proposed EWF installation does not include a separate drainage layer below the Engineered Wood Fiber. Based on project coordination, the Architect of Record did not approve or require construction of an additional drainage layer because the underlying material was considered to have sufficient permeability for the intended application.

Accordingly, the EWF will be installed over the accepted prepared subgrade condition and confined by the required concrete curb, without a separate drainage layer, unless otherwise directed in writing by the Architect of Record, Owner, or Authority Having Jurisdiction.

Contractor Responsibility Limitation - Drainage

By approving this submittal, the Owner and Architect of Record acknowledge that no drainage layer is included in Conengineers Builders LLC scope for the EWF system, and that Conengineers Builders LLC is released from responsibility for impacts resulting from the decision to omit a separate drainage layer below the EWF surfacing.

6. Concrete Containment Curb

As required by the Architect of Record, the EWF areas shall be confined with a concrete containment edge.

Curb Type	Concrete Curb Type D
Nominal Size	6 in. x 12 in.
Purpose	Containment and edge restraint for the loose-fill EWF safety surfacing material
Scope Note	Curb construction is included as the required containment method in lieu of the previously discussed drainage layer.

7. Swing Mats / Wear Mats Clarification

The manufacturer installation instructions recommend wear mats under swings, tire swings, slide exits, and other high-use areas to help reduce displacement of EWF and assist with accessibility-related performance. For this project, the City has indicated that it will provide mats directly if required. The Architect of Record has also indicated that, due to the design/configuration of the proposed swings, the mats are not considered necessary.

Therefore, swing mats / wear mats are not included in Conengineers Builders LLC EWF installation scope unless later directed in writing as additional work or supplied by the City under a separate agreement.

Contractor Responsibility Limitation - Mats

Conengineers Builders LLC does not assume responsibility for the omission of swing mats / wear mats where such omission is based on the Architect of Record determination and/or City direction.

8. Maintenance Responsibility

The City understands and accepts that Engineered Wood Fiber is a loose-fill playground safety surface that requires permanent and ongoing maintenance after acceptance. Maintenance is necessary to preserve the required safety depth and impact attenuation performance. Because the Architect of Record recommended that the EWF not be mechanically compacted during installation, the City will be responsible for monitoring natural settlement/compaction and maintaining the EWF at the required safety depth at all times.

After acceptance, the City shall be responsible for the ongoing maintenance of the EWF, including but not limited to:

- Periodic inspection of EWF depth and surface condition.
- Raking, leveling, and redistribution of displaced material.
- Maintaining the minimum required safety depth at all times.
- Adding top-off material as needed, including after natural compaction or settlement occurs.
- Maintaining transitions at curbs, playground equipment, and access points.
- Addressing displacement caused by normal use, heavy-use areas, abnormal use, vandalism, weather, or maintenance activities.

Post-Acceptance Maintenance
Conengineers Builders LLC is not responsible for permanent maintenance, future top-off material, future displacement, or loss of EWF depth after Owner acceptance.

9. Contractor Responsibility Limitation

Conengineers Builders LLC shall be responsible only for installation of the EWF within the approved project scope, in general accordance with the manufacturer installation instructions and the direction of the Architect of Record and Owner.

Conengineers Builders LLC does not assume responsibility for:

- Design of playground use zones.
- Determination of critical fall heights.
- Determination of required EWF depth beyond the approved design documents and accepted project direction.
- Long-term maintenance of EWF after project acceptance.
- Future top-off material after acceptance.
- The decision to omit the drainage layer below the EWF system.
- The decision not to install swing mats / wear mats where such decision is made by the Architect of Record and/or Owner.
- Performance issues caused by lack of maintenance, natural compaction/settlement after installation, abnormal use, vandalism, drainage conditions not included in Conengineers scope, or future displacement of loose-fill material.

10. Approval Acknowledgment

Approval of this submittal shall constitute acknowledgment of the following project-specific conditions:

1. The EWF system will be installed without a separate drainage layer based on the determination that the underlying material has sufficient permeability.

2. The Architect of Record recommended that the EWF material not be mechanically compacted during installation; the City will monitor and maintain the required EWF height/depth as natural compaction occurs.

3. The required confinement for the EWF shall be provided by a 6 in. x 12 in. Concrete Curb Type D.

4. Swing mats / wear mats are not included in Conengineers scope because the City may provide them directly if required and the Architect of Record has indicated they are not required due to the swing design.

5. The City is responsible for permanent maintenance of the EWF to ensure that the minimum required safety depth is maintained at all times.

6. Conengineers Builders LLC is released from responsibility related to the omission of drainage below the EWF system and the omission of swing/wear mats when such omissions are based on the Architect of Record and/or Owner direction.

11. Attachments

The following documents are included as attachments to this submittal package:

- Appendix A - IPEMA ASTM F1292-22 Certificate of Compliance for Fibar EWF.
- Appendix A - IPEMA ASTM F2075-20 Certificate of Compliance for Fibar EWF.
- Appendix A - IPEMA ASTM F3351-19e1 Certificate of Compliance for Fibar EWF.
- Appendix B - Fibar® Bulk Engineered Wood Fiber Installation Instructions, Rev. May 2024.

Contractor Review / Submitted By

Submitted By	Conengineers Builders LLC
Reviewed By	Jaime Ocampo
Title	General Manager / CEO
Signature	_____
Date	_____

APPENDICES

Original manufacturer certifications and installation instructions follow this page.

INTERNATIONAL PLAY EQUIPMENT MANUFACTURERS ASSOCIATION

America

ASTM F1292-22 CERTIFICATE OF COMPLIANCE

ISSUE DATE: April 9, 2026
Requested By: Seth Rodgers
Project: Con Engineers

In the interest of public playground safety, IPEMA provides a third-party certification service whereby TÜV SÜD American validates a manufacturer's certification of conformance to ASTM F-1292-22 Standard Specification for Impact Attenuation of Surfacing Materials within the Use Zone of a Playground.

The manufacturers listed below have received written validation from TÜV SÜD America that the products listed conform with the requirements of ASTM F1292-22.

TÜV SÜD America validates that the impact attenuating performance criterion specified by ASTM F1292-22 has been met or exceeded.

MODEL #	COMMERCIAL NAME OF PRODUCT	PRODUCT LINE	THK/HT	MANUFACTURER
EWF	Fibar	Fibar Engineered Wood Fiber	12:12	Fibar Group, LLC

INTERNATIONAL PLAY EQUIPMENT MANUFACTURERS ASSOCIATION

America

ASTM F2075-20 CERTIFICATE OF COMPLIANCE

ISSUE DATE: April 9, 2026
Requested By: Seth Rodgers
Project: Con Engineers

In the interest of public playground safety, IPEMA provides a third-party certification service whereby TÜV SÜD America validates a manufacturer's certification of conformance to the ASTM F2075-20 Standard Specification For Engineered Wood Fiber for Use as a Playground Safety Surface Under and Around Playground Equipment.

The manufacturer listed below has received written validation from TÜV SÜD America that the product(s) listed conform with the requirements of ASTM F2075-20.

MODEL #	COMMERCIAL NAME OF PRODUCT	PRODUCT LINE	THK/HT	MANUFACTURER
EWF	Fibar	Fibar Engineered Wood Fiber	12:12	Fibar Group, LLC

INTERNATIONAL PLAY EQUIPMENT MANUFACTURERS ASSOCIATION

America

ASTM F3351-19e1 CERTIFICATE OF COMPLIANCE

ISSUE DATE: April 9, 2026
Requested By: Seth Rodgers
Project: Con Engineers

In the interest of public playground safety, IPEMA provides a third-party certification service whereby TÜV SÜD American uses this test method to determine the shock absorption properties of a playground surface at a specific impact height in order to evaluate a particular playground surfacing system using the g-max and HIC values described in Specification F1292.

The manufacturers listed below have received written validation from TÜV SÜD America that the products listed conform with the requirements of ASTM F-3351-19e1.

TÜV SÜD America validates that the impact attenuating performance criterion specified by ASTM F3351-19e1 has been met or exceeded.

MODEL #	COMMERCIAL NAME OF PRODUCT	PRODUCT LINE	THK/HT	MANUFACTURER
EWF	Fibar	Fibar Engineered Wood Fiber	12:12	Fibar Group, LLC

Fibar® Bulk
Engineered Wood Fiber
Installation

PLEASE NOTE:
In accordance with standard design and construction practices, The Fibar Group, LLC and its Representatives recommend using the services of a certified engineer, architect, or landscape architect who is familiar with local soil and climate conditions to evaluate and interpret any information provided by The Fibar Group, LLC and its Representatives.

The Fibar Group, LLC assumes no responsibility for determining the size of the playground or the Use Zone between the equipment and the border. Installer must thoroughly examine the site and specifications, carefully checking the dimensions before starting work.

All instructions are subject to equipment manufacturers' installation specifications.

Read Fibar® Bulk Engineered Wood Fiber Installation and Maintenance Instructions, all available from The Fibar Group, LLC ☎ 800-342-2721 or ☎ 914-273-8770 or your local Representative.

ABOVE-GROUND INSTALLATION ONLY

1. The area should be well compacted and accurately graded, especially in areas where additional fill has been brought in. It is not recommended that Fibar Engineered Wood Fiber be installed on a grade greater than 10%. All roots, stones, and vegetation must be removed.
2. Install playground equipment.
3. IMPORTANT: With an indelible marker, **mark off all the legs** of the equipment with the compacted design depth.
4. Spread Fibar Engineered Wood Fiber, using a Bobcat or a small front-end loader. Operator should be careful not to turn sharply on the Fibar. It will also be necessary to use hand labor to spread. To allow for natural compaction, we supply additional material. Important: **Install all the material delivered.** The Fibar will be several inches above grade or border until it compacts. Feather the edges to make a smooth transition to existing grade or border.
   OPTIONAL:
   To accelerate the compaction process, Fibar Engineered Wood Fiber can be mechanically compacted at an additional cost. The Fibar can be compacted in the accessible route to the equipment or the entire surface area. To mechanically compact the Fibar, install in 5" lifts using a plate compactor or other mechanical device. Change direction 90 degrees between each layer. Optional: Wet the surface before compacting. Repeat these steps until the desired level finished thickness is achieved. This accelerated compaction method, without wetting the surface, was used in the laboratory for the ASTM F1951 test procedure.
5. Hand-rake for a perfectly smooth, finished surface.
6. Install FibarMat wear mats on top of the Engineered Wood Fiber. **To help ensure compliance with Federal Accessibility Standards, FibarMat wear mats should be installed under all swings, tire swings, and at slide exits.** They should also be installed at other heavy use areas such sliding poles. FibarMat wear mats are available through your local Fibar Representative.

.

7. After two weeks of active use, surface should be raked again.
8. For complete information on Use Zones, contact the Consumer Product Safety Commission (CPSC) *and* ASTM.
9. See Fibar Bulk Engineered Wood Fiber Maintenance Instructions for requirements with respect to inspections, raking, top-off, and other maintenance advice.

Compliance with Federal Law

To prevent displacement of The Fibar in high-use areas, FibarMat wear mats should be installed under all swings, tire swings, slide exits and all other wear areas, including sliding poles. This will help to ensure compliance with federal accessibility standards.

Incorrect Installation or maintenance, failure to install all the materials delivered, failure to maintain the depth of the Fibar Engineered Wood Fiber at the original design depth, failure to use FibarMat wear mats at slide exits, under all swings and tire swings (except enclosed or tot swings), other wear areas (a wear area is any area in the playground where the surface depth falls below the original design depth for the playground surface), use of the Fibar System and/or materials with others not provided by The Fibar Group, LLC, abnormal use, lack of proper maintenance, or vandalism can result in serious injury or death. Be aware that no playground surface can prevent all accidents or injuries.

Winter Conditions.

Should there be moisture retention in the Fibar Engineered Wood Fiber, it will freeze when the temperature drops below the freezing mark. Please check your surface frequently in winter weather. When the surface is frozen, the impact attenuation properties of Fibar are lost and for this reason, the play area should not be used.

Reread the Installation and Maintenance Instructions periodically.

If at any time you are concerned about the surface and its performance, please contact us at ☎ 800-342-2721 or ☎ 914-273-8770.

FIBAR® BULK ENGINEERED WOOD FIBER SPECIFICATIONS, INSTALLATION AND MAINTENANCE INSTRUCTIONS.
© 2013 The Fibar Group, LLC
The Fibar Group, LLC; 80 Business Park Drive, Suite 300, Armonk, NY 10504-1705. ☎ 800-342-2721 ☎ 914-273-8770 Fax 914-273-8659
Email: Info@Fibar.com Website: www.Fibar.com

www.testingservices-usa.com ▪ (706)226-1400
office@testingservices-usa.com

CLIENT:

Company:	The Fibar Group LLC
Address:	Suite 300, 80 Business Park Drive
	Armonk, NY 10504
Requested By:	Joy Dunn

TEST MATERIAL:

Date Material Received:	March 29, 2021
Material Type:	Loose-fill wood fiber
Material Condition:	Excellent, New
Product Name:	Engineered Wood Fiber, 12" compacted depth

TESTING METHODS REQUESTED:

Testing Services, Inc was instructed by the client to perform the following testing..			
Standard:	ASTM F1951-14	Test Method:	Standard Specification for Determination of Accessibility of Surface Systems Under and Around Playground Equipment

SAMPLING PLAN:

Sampling Date:	4/14/2021

- Specimen sampling is performed in the sampling department at TSI.
- The sampling size of specimens is determined by the test method requirements.
- In the event a specific sampling size is not called for, a determination will be made based on previous testing experience, and approved for use by an authorized manager.
- All samples are subjected to the outside environmental conditions of temperature and relative humidly.
- Sample requiring pre-determined exposure to specified environmental conditions based on a specific test method, take place in the departments in which they are tested

DEVIATION FROM TEST METHOD:

State reason for any Deviation from, Additions to, or Exclusions From Test Method.
none

REQUIREMENT:

A surface in place shall have average work per foot (work per meter) values for straight propulsion and for turning ***less*** than the average work per foot (work per meter) values for straight propulsion and for turning, respectively, on a hard, smooth, surface with a grade of 1:14 (7.1 %).

PROCEDURE:

Test Surface Preparation: Tests were conducted on 4/15/2021 indoors at Testing Services in an environment of 71°F and 26% R.H. The mulch was installed in a wooden box (44"W x 117"L). At the request of the client, the engineered wood fiber was installed in the wooden box in 5" lifts. Each lift was raked and leveled before compacting with a mechanical plate compactor, changing direction 90 degrees between each layer. The steps were repeated until 12" compacted, finished, level thickness was achieved. Sample was NOT wet, tested as is.

Wheelchair/Operator: The wheelchair used in these tests was manufactured by *Invcare,* Model Action Xtra, Serial Number 98J84142. This wheelchair is totally adjustable, a necessity for these tests. The pneumatic tires were inflated to 60 psi on the rear and 32 psi on the front. The weight of the wheelchair was 24.25 pounds and the operator's weight was165 pounds for a total of 189 pounds. The operator's distribution was adjusted to 60% on the rear wheels and 40 % on the front.

Torque Measuring System: A certified *Mecmesin Advanced Force Gauge*, Model 500N, was used as an interface between a *Dell* Laptop and a calibrated *Smart Torque Wrench*, S/N 97-0085-01. Emperor Lite Software, from *Mecmesin*, logged the load vs. time and integrated the area under the resulting curves. The adapters and accessories needed to attach the instrumentation were fabricated locally. This total package added 10 pounds to the total weight bringing the total to 199 pounds.

Testing Services (TSI) LLC
817 Showalter Avenue
PO Box 1343
Dalton, GA 30721

OUR LETTERS AND REPORTS APPLY ONLY TO THE SAMPLE TESTED AND ARE NOT NECESSARILY INDICATIVE OF THE QUALITIES OF APPARENTLY IDENTICAL OR SIMILAR PRODUCTS. THESE LETTERS AND REPORTS ARE FOR THE USE ONLY OF THE CLIENT TO WHOM THEY ARE ADDRESSED AND THEIR COMMUNICATION TO ANY OTHERS OR THE USE OF THE NAME TESTING SERVICES, INC. MUST RECEIVE OUR PRIOR WRITTEN APPROVAL. OUR REPORTS, LETTERS, NAME, SEALS, OR INSIGNIA ARE NOT UNDER ANY CIRCUMSTANCES TO BE USED IN ADVERTISING TO THE GENERAL PUBLIC.

www.testingservices-usa.com ▪ (706)226-1400
office@testingservices-usa.com

CLIENT:

Company:	The Fibar Group LLC
Address:	Suite 300, 80 Business Park Drive
	Armonk, NY 10504
Requested By:	Joy Dunn

TEST MATERIAL:

Date Material Received:	March 29, 2021
Material Type:	Loose-fill wood fiber
Material Condition:	Excellent, New
Product Name:	Engineered Wood Fiber, 12" compacted depth

TEST SUMMARY:

TEST METHOD	Maximum Requirements – Average Work/ft-Force	TEST RESULTS – Average Work/ft-Force
ASTM F1951-14	Baseline Straight: 15.08 lbs	12.28 lbs
	Baseline Turning: 11.05 lbs	7.88 lbs

Straight Propulsion	1	2	3	4	5
Circumference of Rear Wheel	75.375"	75.375"	75.375"	75.375"	75.375"
Area	51.7021 ft*lbs*s	48.4200 ft*lbs*s	46.1788 ft*lbs*s	47.5517 ft*lbs*s	47.5927 ft*lbs*s
Time	7.83 seconds	7.80 seconds	7.77 seconds	7.79 seconds	7.79 seconds
Distance	86.0 inches	86.0 inches	86.0 inches	86.0 inches	86.0 inches
Distance	7.17 ft	7.17 ft	7.17 ft	7.17 ft	7.17 ft
Angular Displacement (radians)	7.17 rad	7.17 rad	7.17 rad	7.17 rad	7.17 rad
Average Torque (energy)	6.60 ft lbs	6.21 ft lbs	5.94 ft lbs	6.10 ft lbs	6.11 ft lbs
Total Work (energy)	94.67 ft lbs	89.00 ft lbs	85.21 ft lbs	87.52 ft lbs	87.60 ft lbs
Work/ft (force)	13.21 lbs	12.42 lbs	11.89 lbs	12.21 lbs	12.22 lbs
Drop Hi/Low Work/ft (force)		12.42 lbs		12.21 lbs	12.22 lbs
Average Work/ft (force)	12.28 lbs				

Turning Propulsion	1	2	3	4	5
Circumference of Rear Wheel	75.375"	75.375"	75.375"	75.375"	75.375"
Distance from Pivot Point to Outer Wheel	35.75 inches	35.75 inches	35.75 inches	35.75 inches	35.75 inches
Area	66.7834 ft*lbs*s	57.0005 ft*lbs*s	65.7820 ft*lbs*s	60.2651 ft*lbs*s	55.3295 ft*lbs*s
Time	7.81 seconds	7.72 seconds	7.78 seconds	7.74 seconds	7.70 seconds
Angle Traveled (degrees)	91.0°	91.0°	91.0°	91.0°	91.0°
Angle Traveled (radians)	1.59 rad	1.59 rad	1.59 rad	1.59 rad	1.59 rad
Arc Length Traveled by Outer Wheel	56.78 inches	56.78 inches	56.78 inches	56.78 inches	56.78 inches
Arc Length Traveled by Outer Wheel	4.73 ft	4.73 ft	4.73 ft	4.73 ft	4.73 ft
Angular Displacement of Outer Wheel (radians)	4.73 rad	4.73 rad	4.73 rad	4.73 rad	4.73 rad
Average Torque (energy)	8.55 ft lbs	7.38 ft lbs	8.46 ft lbs	7.79 ft lbs	7.19 ft lbs
Total Work (energy)	40.47 ft lbs	34.95 ft lbs	40.02 ft lbs	36.85 ft lbs	34.01 ft lbs
Work/ft (force)	8.55 lbs	7.39 lbs	8.46 lbs	7.79 lbs	7.19 lbs
Drop Hi/Low Work/ft (force)		7.39 lbs	8.46 lbs	7.79 lbs	
Average Work/ft (force)	7.88 lbs				

CONCLUSION: The above listed material *meets/exceeds* both the straight line and turning propulsion requirements set forth in this test, where the surface tested average work per foot value was less than the average work per foot value verses a hard, smooth surface with a grade of 7.1%

Uncertainty:
We undertake all assignments for our clients on a best effort basis. Our findings and judgments are based on the information to us using the latest test methods available.
TSI can only ensure the test results for the specific items tested.
Unless otherwise noted in the deviations sections of this report, all tests are performed in compliance with stated test method.

Test Report Approval:

Erle Miles, III, Lab Director Testing Services (TSI) LLC

TSi Accreditation: Our laboratory is accredited by the US Dept. of Commerce, National Institute of Standards and Technology: ISO/IEC 17025:2005. Our code # is: NVLAP 100108-0.
TSi is an Organizational Member of ASTM (American Society for Testing and Materials). TSi is a certified independent testing laboratory by the STC (Synthetic Turf Council).

Testing Services (TSI) LLC
817 Showalter Avenue
PO Box 1343
Dalton, GA 30721

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